No. 619,253. Patented Feb. 7, 1899.

W. P. HARTHAN.

LIQUID MEASURING ELEVATOR.

(Application filed Mar. 14, 1898.)

(No Model.)

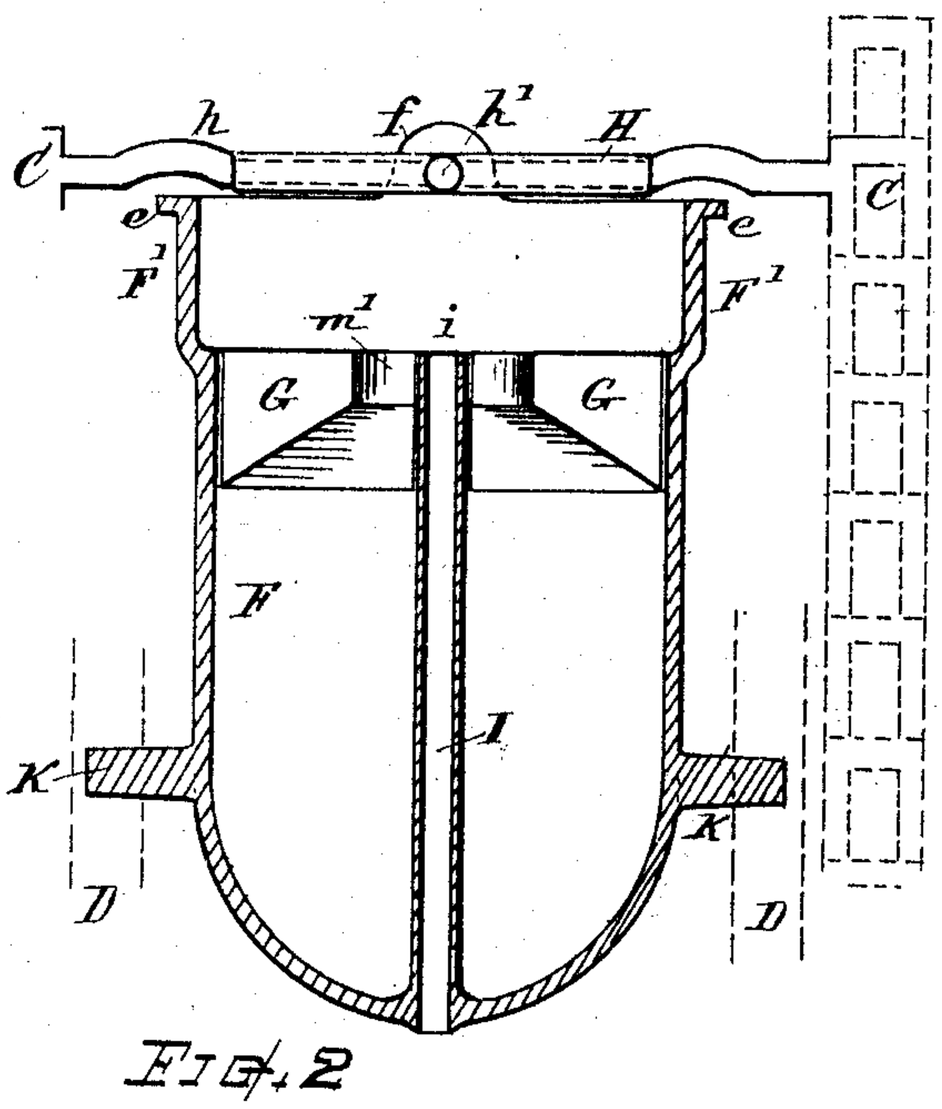


FIG. 2

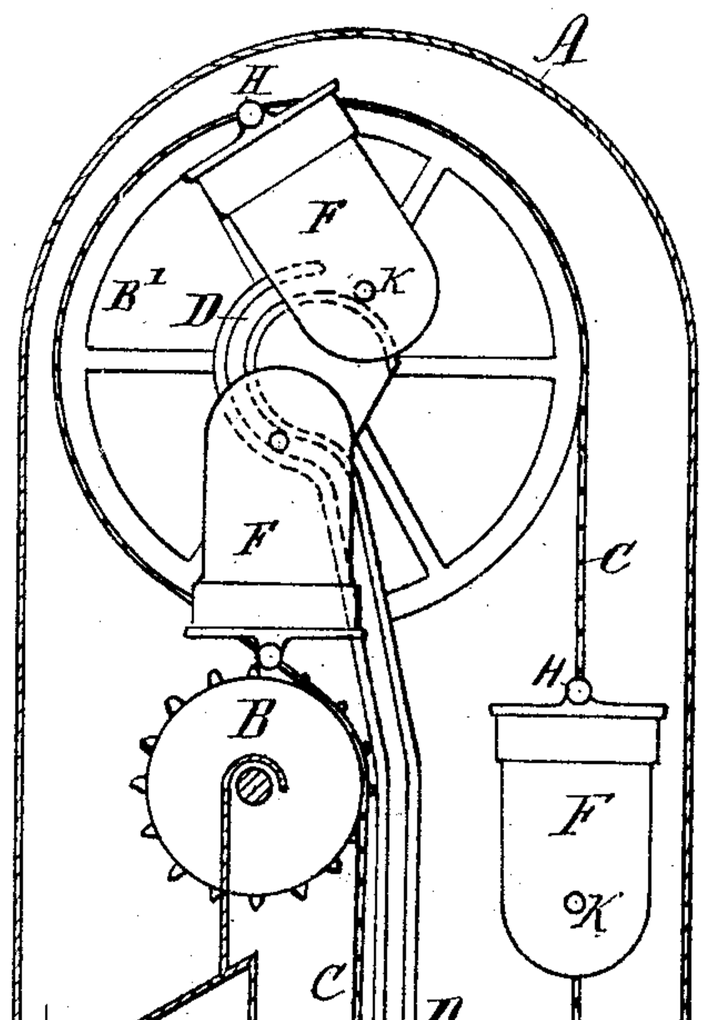


FIG. 1

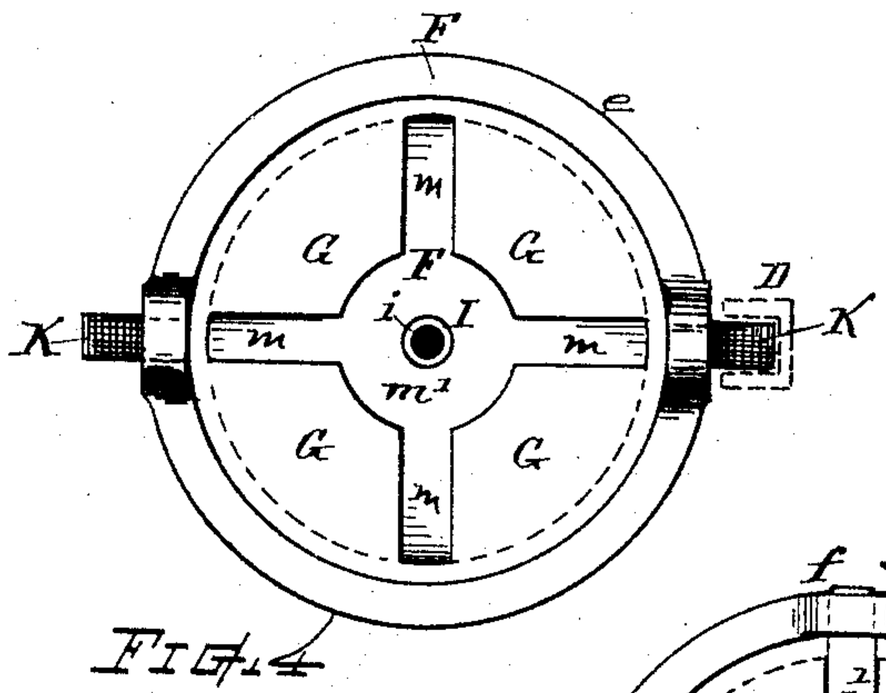
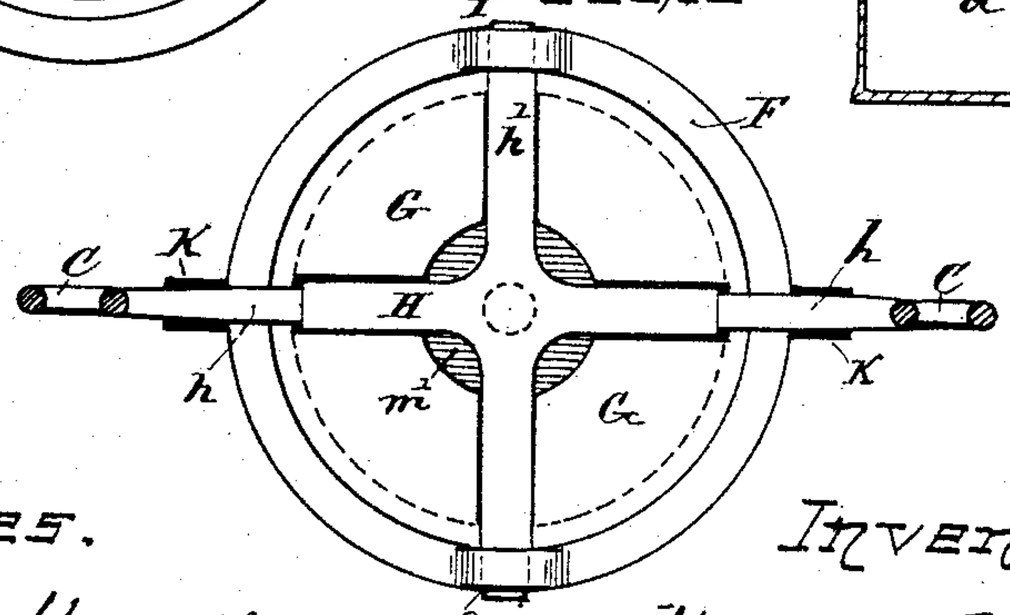


FIG. 4

FIG. 3



Witnesses.

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UNITED STATES PATENT OFFICE.

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LIQUID-MEASURING ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 619,253, dated February 7, 1899.

Application filed March 14, 1898. Serial No. 673,686. (No model.)

To all whom it may concern:

Be it known that I, WARREN P. HARTHAN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Liquid-Measuring Elevators, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide a liquid-measuring bucket more especially designed for use in connection with traveling-chain elevators, which bucket shall give an accurate volume measurement without requiring that the chains and running apparatus be nicely adjusted.

Another object is to provide a simple means for lowering the relative surface-level and obviating loss or overflow from the measured bucketful of liquid at the instant or during the time of tilting the bucket preparatory to discharging.

Another object is to provide the bucket with means for effecting inversion and maintaining its inverted relation during its downward movement.

These objects I attain by the mechanism illustrated in the drawings, wherein—

Figure 1 is an elevation diagram showing the relative arrangement of the elevator mechanism and the action of the buckets therein. Fig. 2 is a vertical section of my improved liquid-elevator bucket. Fig. 3 is a top plan view of the same, and Fig. 4 is a top view with the suspending bars removed for showing the internal bulks at the measure-surface.

Referring to parts, A indicates the elevator-case, B the operating-sprocket, and C the elevator or bucket chain, two of which are employed, one at each side, passing around the head-wheel B′ and foot-wheel B^2 and operated by force applied to the shaft of the sprocket-wheels B in well-known manner.

D indicates a guide for controlling the reverse action of the buckets.

My improved bucket consists of a cup-shaped receptacle F, open at the top and closed at the bottom and provided with an internal tube I, leading from the interior to the exterior and adapted for permitting the escape or overflow of any excess of liquid above the exact desired measurement. The cup or bucket is made to hold a given amount below the level of the tube-mouth *i* and may be gaged to any exact measurement, according to the requirements of any particular elevator in which the particular bucket is to be used. The bucket is here shown as cylindrical on plan, but, if preferred, could be made square or on any regular form in cross-section. The mouth *i* of the tube I is best disposed at the immediate center of the bucket F, and the wall of the bucket at F′ extends somewhat above the measuring point or level of the tube's mouth. The upper portion F′ is best enlarged and furnished with an outwardly-flanged edge *e*.

At the top of the bucket is provided a suspending appliance H, attached thereto by hinging-joints at *f*, that allow free swinging action in the connection between the bucket F and the elevator-chains C. The suspension appliance is best made as a cross or universal joint mechanism, one portion hinging on the crosswise axis *h* coincident with the plane of the chains C and the other, *h*′, hinging at right angles thereto, as shown in Figs. 2 and 3. In some instances, if desired, the form of the hinging and suspending appliance may be modified without materially affecting the carriage of the bucket, which is designed to swing free and take its self-found balance position as it is raised by the chain.

On the interior of the bucket, at a position approximately corresponding with the limit of the measurement-space, I provide a bulk or series of bulks G, that occupy by solid substance a portion or portions of the measuring-receptacle. These bulks are preferably made, as indicated, projecting inward from the wall of the bucket perpendicular to the axis and with their top surface on a level with the end *i* of the tube I, while their body stands below such level and is made of considerable thickness. Spaces, holes, or channels *m* are formed through the bulks G adjacent to the wall of the bucket to permit free descent of the liquid, and a central space *m*′ is formed about the end of the tube I.

The bulk-blocks G may be integral with

the shell of the bucket, or can, if preferred, be made separate and then fitted and firmly secured therein, their general construction being substantially the same in either case, but the latter method permitting adjustment.

Upon the exterior of the bucket, at its rounded cheek portions, near the lower end, I provide opposite projecting prongs or studs K, that stand outward from the shell laterally and are adapted to engage with the guides D at opposite sides of the elevator-frame for the purpose of effecting inversion of the bucket and for maintaining it in inverted position and guiding it in its downward run, as indicated in Fig. 1.

The operation of this bucket is as follows: Movement of the chain C draws the bucket through the liquid in the lower part of the elevator-case, and as it rises it takes up its full capacity of liquid. The universal or hinged suspending device allows the receptacle F to hang free and plumb, so that the liquid can take its level therein, while the excess of liquid over the given measurement quantity escapes through the tube I. The end of the tube being at the center of the bucket renders the measurement accurate, since an excessive overflow cannot then be occasioned by one side of the bucket hanging slightly lower than the other. As the bucket rises the liquid is drained down to the level of the tube-mouth *i*, which is the measurement-gage. Its top surface is then broken by the bulks or projecting blocks G, which bulks occupy a portion of the measure area. When the bucket is tilted, as when passing to the position of discharge, the bulk G at the upper or rising side of the bucket is lifted from the mass of the liquid. This removal of so much of the bulk as corresponds to the degree of tilt increases the available measure-space and permits the surface-level to drop relatively to the end or mouth *i* of the tube I, so that the tilting action will not cause any additional overflow through the tube, thus avoiding any derangement in measure or quantity of liquid that might otherwise occur after such measure has been once gaged by the liquid setting itself level with the tube end *i*.

By the bucket thus formed and furnished with projections or bulks I am enabled to produce a liquid-elevator that will measure with sufficient accuracy to be used as a "sealed measure" and which will not be subject to variation by slight irregularities in the setting up of the elevator. The buckets take their level from central suspension. They discharge to measure from a central point on the liquid-surface, and any waste flow by tilting is obviated by the lifting of the solid body or bulk from the measured liquid.

When the prongs K engage the guide D, the bucket is controlled in its downward and inverted action until it reaches the turn at *x*, where it is freed and thrown outward to follow the line of the under dip-guide *d*, so as to come up filled and again pass in operation, as above described.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. In a liquid-elevator bucket the combination with the bucket and its overflow tube or orifice, of a solid body or bulk arranged within the liquid-reservoir adjacent to the measurement-level, and adapted for relieving the liquid-level by elevation from the measured liquid, upon the tilting of the bucket, substantially as set forth.

2. A measuring cup or bucket having the open top and closed bottom, and provided with an internal tube open at or near its end to permit any excess of liquid to escape from the interior, the walls of the bucket being extended above the measuring-point; in combination with internal fixed bulks or projecting blocks disposed within the receptacle approximately at the level of the mouth of said tube, for the purpose set forth.

3. The measuring-bucket for liquid-elevators, comprising the cup-shaped open-topped body having the central tube terminating at a point below the top of the bucket, the inwardly-projecting bulks having their top surface approximately level with the mouth of said tube, and provided with internal spaces or openings through the bulks adjacent to the side of the bucket, for the purpose set forth.

4. The liquid-measuring elevator-bucket provided with the guide-prongs, and the universal suspending appliance and the internal bulks, in combination with the elevator-chain C, and guides D, substantially as set forth.

Witness my hand this 11th day of March, 1898.

WARREN P. HARTHAN.

Witnesses:
CHAS. H. BURLEIGH,
JULIUS GARST.